ABSTRACT

The present invention relates to the use of diagnostic ultrasound and microbubble-based ultrasound contrast agents to accomplish noninvasive subharmonic aided pressure estimation (SHAPE) in the cavity of the heart, in other organs, and in major blood vessels. Diagnostic ultrasound provides noninvasive, real-time cross-sectional images and parameter estimations without ionizing radiation and without the disadvantages and risks of invasive methods of imaging and measurement. SHAPE is a non-invasive, direct, and accurate method for pressure estimation utilizing sub-harmonic or ultraharmonic signals from contrast agents. In light of the advantages of diagnostic ultrasound, SHAPE provides an economical alternative, a safe avenue, and an earlier timetable for assessing the clinical condition of patients, especially critically ill patients.